

AT-320 IAX2 Phone User Manual

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1. AT-320 IP phone Appearance Introduction

- AT-320 IP Phone Front Illustration (Refer to Fig 1.1):



Fig 1.1 AT-320 IP Phone Illustration

1.1 Function Keys of AT-320 IP Phone Introduction (Normal State):

Keys	Function
F1	With handset hung, press this key to get local IP address of the phone
F2	Speed Dial Key
NUMBER	With handset hung, press this key to get phone number
ANS CAL	With handset hung, press this key to review received number
MISCAL	With handset hung, press this key to review missed number
FWD	Call transfer key
HOLD	Call hold key
DIACAL	With handset hung, press this key to review dialed number
Vol+	Increase the volumes of handset or speaker; turn over the record backward
Vol-	Decrease the volumes of handset or speaker; turn over the record forward
Redial	While reviewing missed, received or dialed number, press this key to dial current number
Speaker	Press this key to have a call without lifting the handset
SET	Enter setting mode
OK	Confirm change, enter submenu
EXIT	Back to the parent menu

2. Features

2.1 Hardware

- Main chip—PA1688 50MHz
- Data Memory—16MB SDRAM
- Program Memory—8 MB Flash memory
- Ethernet Jack—1/2 10/100M jacks
- AC/DC adapter—Output 12V DC, 450mA

2.2 Software

- DHCP support for LAN or Cable modem
- PPPoE support for ADSL or Cable modem
- Set phone by HTTP web browser (IE6.0) or Telnet
- Upgrade by FTP
- Support major G.7XX; GSM 610; iLBC audio Codec
- VAD (Voice Active Detect)
- CNG (Comfort noise generation)
- Dynamic voice jitter buffer
- G.168/165 compliant 16ms echo cancellation
- Tone generation and Local DTMF re-generation according with ITU-T
- E.164 dial plan and customized dial rules
- 100 entries for quick dial
- 80 entries each for missed calls, answered calls and dialed calls
- Adjustable volume for both handset and speaker
- Voice prompt
- Hotline
- Support adjustable user password and super password

2.3 Standard and Protocol

AT-320 IP Phone supports following standard and protocol:

- IEEE 802.3 /802.3 u 10 Base T / 100Base TX
- Major G.7XX; GSM610 iLBC audio Codec
- IAX2 (Inter-Asterisk-eXchange V2)
- TCP/IP: Internet transfer and control protocol
- RTP: Real-time Transport Protocol
- RTCP: Real-time Control Protocol
- VAD/CNG save bandwidth
- DHCP: Dynamic Host Configuration Protocol
- PPPoE: PPP Protocol over Ethernet
- DNS: Domain Name Server

- Telnet: Internet's remote login protocol
- FTP: File Transfer protocol
- HTTP: Hyper Text Transfer protocol

2.4 Operating requirements

- Operation temperature: 0 to 40° C (32° to 104° F)
- Storage temperature: -30° to 65° C (-22° to 149° F)
- Humidity: 10 to 90% no dew

2.5 Electric requirements

- Voltage: 9V~24V
- Power adapter: output DC 12V/450mA
- Network interface: 1/2X RJ-45 Ethernet Connectors

2.6 Size

200 X 195 X 87 mm (L x W x H)

2.7 Installation

1. Connect handset to base: insert handset cord into handset cord jack at the left side of the base.
2. Connect IP phone to Internet: plug the RJ-45 Ethernet cable into the Ethernet Jack. Plug the other end of the cable into HUB.
3. Power on IP phone: plug the power cord adapter into the Power Jack. Then plug the other end of the power cord adapter into the appropriate wall outlet.

3. Configuration

Four different ways can be used to configure AT-320 IP phone: phone keypad, web browser, Telnet commands and PalmTool configuration tool on computer.

3.1 Phone Keypad setup

3.1.1 Function Keys Introduction:

When using keypad and LCD to configure the settings of IP phone, following keys will be used:

Keys	Function	Keys	Function
F1/LOCIP	Enter setting mode	OK/Speaker	Enter submenu; confirm change
VOL+	Turn over menu backward	VOL-	Turn over menu forward; move cursor backward
Digital key	Modify values	EXIT/Redial	Exit current menu; exit setting mode

- **Enter the keypad setting mode**

Press “**Speaker**” key→enter “**1234#**”→you can see LCD display password”→enter “**1234**”→press “**speaker**” key to confirm.

- **Select the submenu**

After entering the main menu, press “**VOL+**” or “**VOL-**” to page the menu up or page the menu down; when you want to set the submenu item to be displayed, press “**OK/speaker**” to enter the submenu.

- **Enter the EDIT mode**

After entering the submenu, when you want to set the submenu item to be selected, press “**Set**” to enter EDIT mode.

- **Enter the settings**

Once the phone enters EDIT mode, enter the settings by numeric keypad respectively, then press “**OK/speaker**” key to confirm.

- **Modify enter error**

If the errors come forth when you enter the settings, press “**VOL-**” key to delete it and enter the settings again

- **Abort the settings**

If there is no need for the modified settings, press “**EXIT**” key to return to the main menu, and press “**VOL+**” or “**VOL-**” to page the menu up or page the menu down; When “exit settings” submenu item is selected, press “**OK/speaker**” key to confirm, AT-320 IP phone will reboot and be

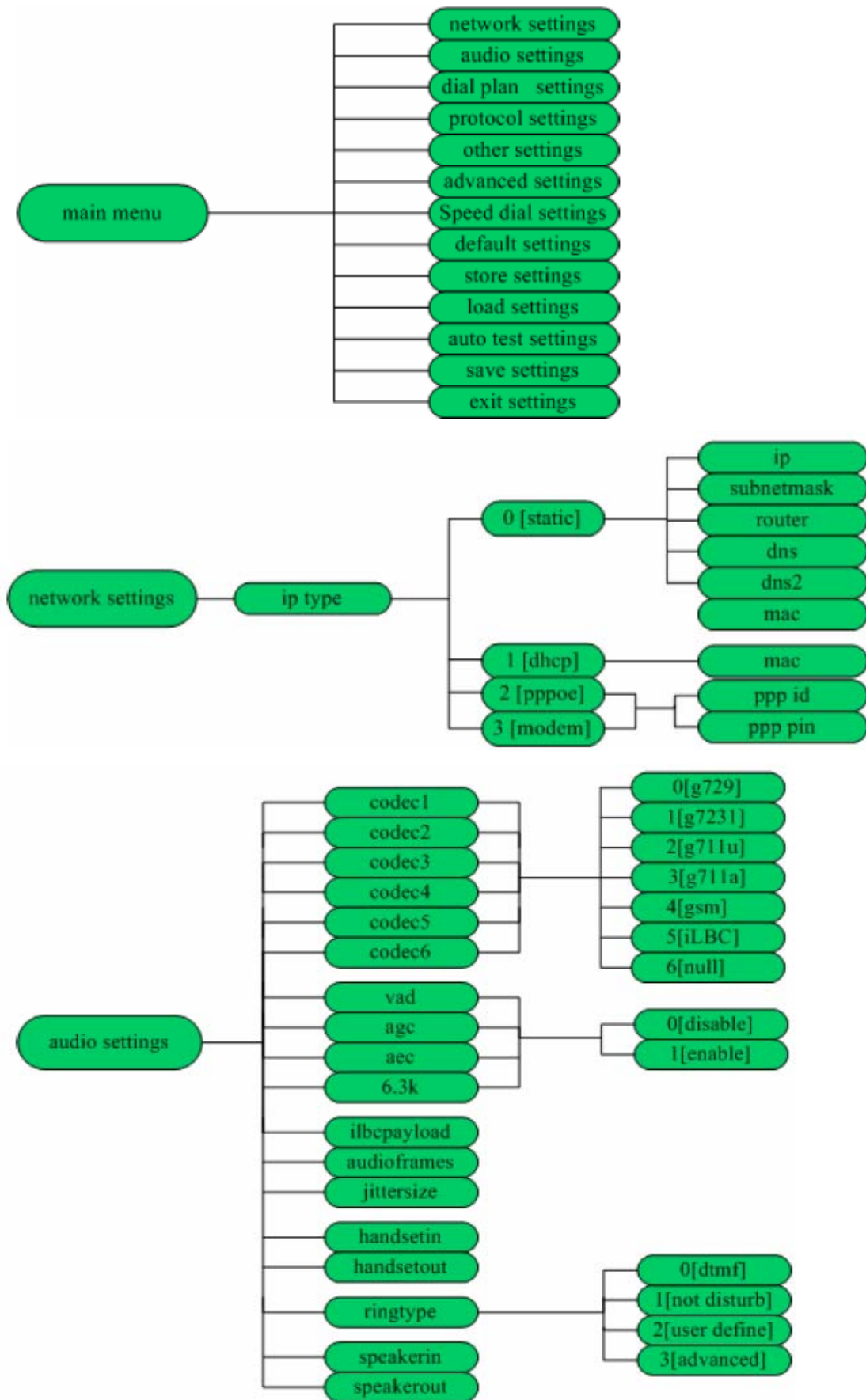
used the current settings.

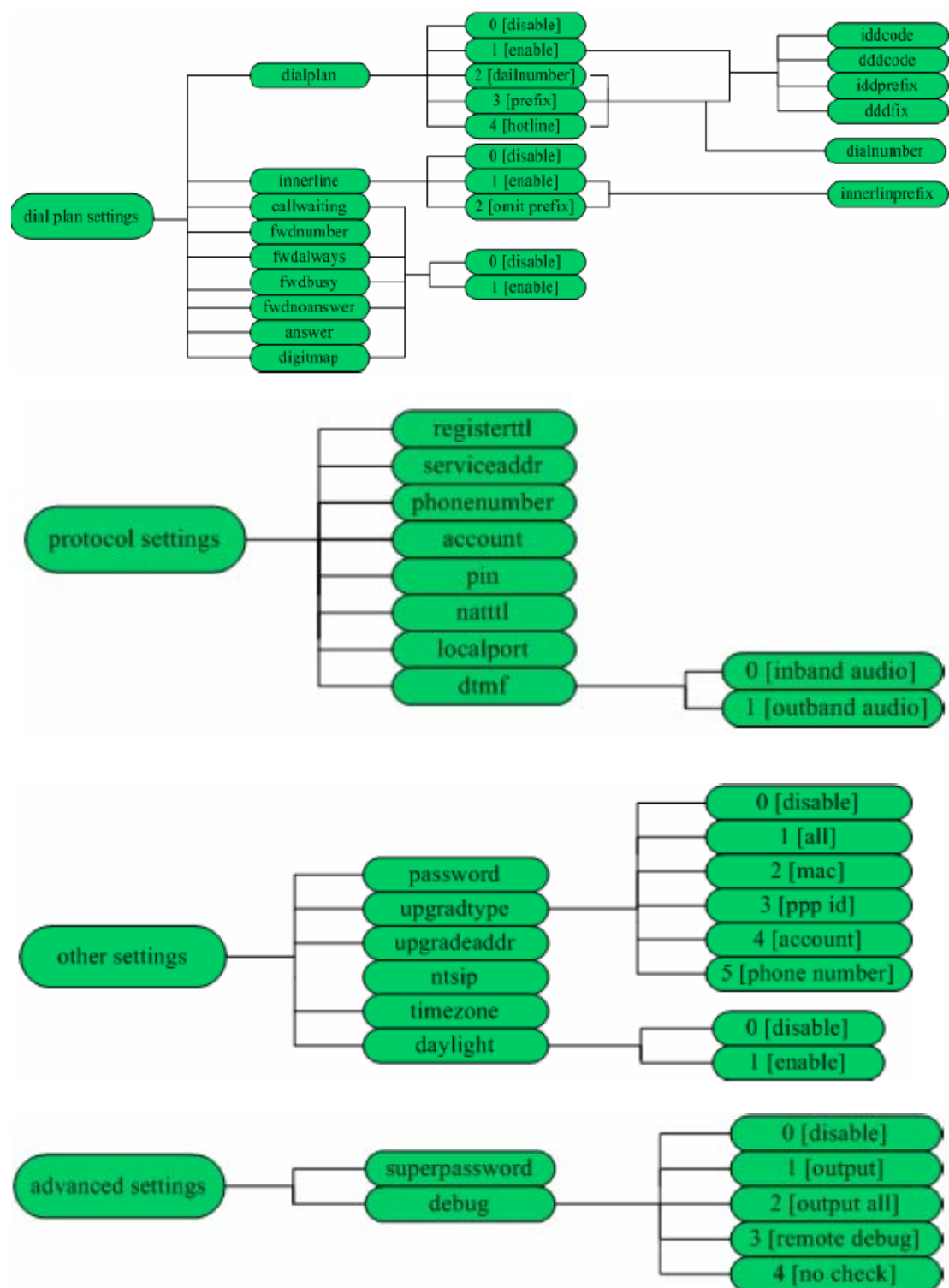
- **Save the settings**

When all parameters have modified, press “**EXIT**” key to return to the main menu, and press “**VOL+**” or “**VOL-**” to page the menu up or page the menu down; When “save settings” submenu item is selected, press “**OK/speaker**” key to confirm, AT-320 IP phone will reboot and use the already modified setting.

Refer to above operation; you can reach any menu to modify any value. Please refer to following structure illustrations to learn the values of each menu item. As for the meaning of each item and value, please refer to **Web Browser Setting** chapter.

➤ **Menu Structure:**





3.1.2 Keypad setup step by step:

For example, you want to setup jack's number 56712389 as speed dial number, you can:

Step 1. **Enter setup mode:** press "Speaker" key→enter "1234#"→you can see LCD display "password"→enter "1234"→press "Speaker" key to confirm.

Step 2. **Set speed dial number:** use "Vol +/-" key to choose the "speed dial setting" menu→press "speaker" enter its submenu and choose "memory 1"→ press "Local IP" key and enter "jack" to modify→ press "Speaker" to confirm→choose "number 1"→press "Local IP" key and enter "56712389" to modify→ press "Speaker" to confirm.

Step 3. **Save your setting:** use "redial" key return to main menu→choose "save setting"→ press "Speaker" to confirm the change.

3.2 Configured by WEB

Double click  icon to open the IE browser. Input the IP address of the phone into address bar (Address 192.168.1.100), and then input password of the phone into the following page. Default password 1234 is ordinary password and super password is 12345678. With Debug set 0[disable], please input super password; while Debug is not set as 0[disable], please input ordinary password. Then click button. The following configured page will pop up. Refer to Fig 3.1 please.

Network Settings					
iptype	static	ppp id		ppp pin	
local ip	192.168.1.100	subnet mask	255.255.255.0	router ip	192.168.1.254
dns	202.106.46.151	dns2	202.96.128.68	mac	00-09-45-0a-45-2e
Audio Settings					
codec1	g729	codec2	g7231	codec3	g711u
codec4	g711a	codec5	null	codec6	null
vad	☒	agc	☐	aec	☒
audio frames	2	g.723.1 high rate	☒	ilbc payload	98
jitter size	0	handset in(0-15)	7	handset out(0-31)	20
ring type	dtmf	speaker out(0-31)	20	speaker in(0-15)	0
Dial Plan Settings					
use dialplan	disable	dial number		ddd code	10
idd code	86	idd prefix	00	ddd prefix	0
inner line	disable	inner line prefix	0	call waiting	☐
forward number	82378801	fwd poweroff	☐	fwd noanswer	☐
fwd always	☐	fwd busy	☐	answer	30
use digitmap	☐				
IAX2 Protocol Settings					
service addr	203.93.9.57	register ttl	60		
phone number	82378808	account		pin	
local port	1720	dtmf	outband signal	tos	0
super password	12345678	debug	output		
Other Settings					
password	1234	upgrade type	disable	upgrade addr	
snmp ip	255.255.255.255	use daylight	☐		
timezone	(GMT+08:00)Beijing,Hong Kong,Urumqi				
Save Settings		Address Book		Upgrade Firmware	

Fig 3.1 Http Setting

3.2.1 Network Setting:

network settings					
iptype	static	ppp id	test1	ppp pin	test1
local ip	192.168.1.100	subnet mask	255.255.255.0	router ip	192.168.1.254
dns	202.106.196.115	dns2	202.96.128.68	mac	00-09-45-63-17-d8

Fig 3.2 Network Setting

- **IPtype:** Set how IP phone gets relevant network parameters by selecting corresponding item from drop down list.
 - **static IP:** Select this item to authorize users set IP address, subnet mask and router IP address of IP phone manually.
 - **dhcp:** Select this item to enable DHCP mode. With this system, your LAN or router automatically assigns all the required network parameters to any device connected to it when the device log on. AT-320 IP phone is shipped from the factory with DHCP on. So, if your LAN or router is configured to use DHCP addressing, the IP phone's LAN parameters will automatically be configured as soon as it is connected to the LAN or router and powered up.
 - **PPPoE:** Those ADSL and Cable Modem users please select this item for it is a protocol especially designed for them. With this system, ADSL ISP automatically assigns all the required IP parameters to any device connected to it when the device log on.
 - **modem:** If the IP phone used with modem, please select this item to get relevant network parameters auto. Then please fill ID and pin into ppp id and ppp pin fields.
- **ppp id:** With **PPPoE** or **modem** selected in **IPtype** drop down list, please enter the user name here.
- **ppp pin:** With **PPPoE** or **modem** selected in **IPtype** drop down list, please enter the password here.
- **local IP:** With **static IP** selected in **IPtype** drop down list, please enter IP address of IP phone here.
- **subnet mask:** With **static IP** selected in **IPtype** drop down list, please enter subnet mask of IP phone here.
- **router IP:** With **static IP** selected in **IPtype** drop down list, please enter router IP address of IP phone here.

- **dns:** With **static IP** selected in **IPtype** drop down list, please enter IP address of DNS server here.
- **dns 2:** With **static IP** selected in **IPtype** drop down list, please enter IP address of backup DNS server here.
- **mac:** MAC address is the physical address supplied by the Ethernet NIC. AT-320 phone is shIPped from the factory with a unique algorithm MAC address printed on the back of the base.

 **Note** To avoid colliding with other device in network, please don't change the MAC address arbitrarily. If you have use “* and power on twice” method to enter the safe mode of your phone, remember to change the phone's MAC to factory default after safe mode.

3.2.2 Audio Setting:

Audio Settings					
codec1	g729	codec2	g7231	codec3	g711u
codec4	g711a	codec5	null	codec6	null
vad	☒	agc	☐	sec	☒
audio frames	2	g.723.1 high rate	☒	ilbc payload	98
jitter size	0	handset in (0-15)	7	handset out (0-31)	20
ring type	dtmf	speaker out (0-31)	20	speaker in (0-15)	0

Fig 3.3 Audio Setting

- **codec1:** Set the priority 1 of the audio compression algorithm. The options are g729, g7231, g711u, g711a ,gsm and iLBC.
- **codec2:** Set the priority 2 of the audio compression algorithm. The options are g729, g7231, g711u, g711a ,gsm and iLBC.
- **codec3:** Set the priority 3 of the audio compression algorithm. The options are g729, g7231, g711u, g711a ,gsm and iLBC.
- **codec4:** Set the priority 4 of the audio compression algorithm. The options are g729, g7231, g711u, g711a ,gsm and iLBC.
- **codec5:** Set the priority 5 of the audio compression algorithm. The options are g729, g7231, g711u, g711a ,gsm and iLBC.
- **codec5:** Set the priority 6 of the audio compression algorithm. The options are g729, g7231, g711u, g711a ,gsm and iLBC.

- **vad:** Enable/disable VAD (voice activity detection).
- **agc:** Enable/disable AGC.
- **aec:** Enable/disable AEC.
- **g.723.1 high rate:** enable/disable g.723.1 high rate. G.723.1 high rate is 6.3kbps, low rate is 5.3kbps.
- **audio frame:** Set audio frames in RTP package. Minimum is 1 and maximum is 8.
- **jitter size :** Set buffer size of RTP package. The value range is 0-32.
- **ilbc payload :** Set the payload type of RTP package when ILBC codec selected to DTMF delay. The value range is 96-255.
- **handset in:** Drag the slider to adjust the volume of handset input. Drag it to the left to reduce the volume; while drag it to the right to increase the volume.
- **handset out:** Drag the slider to adjust the volume of handset output. Drag it to the left to reduce the volume; while drag it to the right to increase the volume.
- **ring type:** Set ring type by selecting corresponding item from drop down list.
 - **dtmf:** Set ring as ordinary rings in different frequency
 - **not disturb:** Set the phone do not ring by selecting this item.
 - **Advanced:** Set ring used the individualized tone provided by system (need system support).
 - **user define:** Set ring as music saved by user by selecting this item.
- **speaker in:** Set the volume of handfree input.
- **speaker out:** Set the volume of handfree output.

3.2.3 Dial plan Setting:

Dial Plan Settings					
use dialplan	disable	dial number		ddd code	10
idd code	86	idd prefix	00	ddd prefix	0
inner line	disable	inner line prefix	0	call waiting	☐
forward number	82378801	fwd poweroff	☐	fwd noanswer	☐
fwd always	☐	fwd busy	☐	answer	30
use digitmap	☒				

Fig 3.4 Dial Plan Setting

- **use dialplan:** Set whether use dial plan or use dial number by selecting the corresponding item in drop down list.
 - **disable:** Do not use dial plan or dial number by selecting this item.
 - **enable:** Use dial plan by selecting this item.
 - **dialnum:** Use dial number by selecting this item. With this item selected, please enter the dial prefix into **dial number** field.
 - **prefix:** Use specially service by selecting this item.
 - **Hotline:** Use Hotline function by selecting this item. With this item selected, please enter the hotline number into **dial number** field.
- **dial number:** With **dialnum** selected in **use dialplan** drop down list, please enter the dial prefix into this field according to requirement of log in server. For example, with eTalk card used, enter 00 here.
- **ddd code:** With **enable** or **dialnum** selected in **use dialplan** drop down list, set area code according to E.164 dial rule. For example, Beijing 10; Shanghai 21.
- **idd code:** With **enable** or **dialnum** selected in **use dialplan** drop down list, set country code according to E.164 dial rule. For example, China 86; U.S.A .1.
- **idd prefix:** With **enable** or **dialnum** selected in **use dialplan** drop down list, set international call prefix according to E.164 dial rule, such as 00.
- **ddd prefix:** With **enable** or **dialnum** selected in **use dialplan** drop down list, set long distance call prefix according to E.164 dial rule, such as 0.

 **Note** With **dialnum** selected in **use dialplan** drop down list, you can also set dddcode, iddcode, iddprefix and dddprefix according to requirement of system.

- **innerline:** Enable/disable multi-settings by selecting corresponding items from dropdown list. AT-320 IP phone allows saving 5 settings totally.

- **disable:** Disable multi-settings by selecting this item, then the phone will call out using current setting.
- **enable:** Use designated system to place calls by selecting this item.
- **innerlineprefix:** With enable selected in innerline dropdown list, please fill the prefix number pick up to inner line, such as 0.
- **Use digitmap:** Enable/disable digit map by checking/unchecking the box.
- **Call waiting:** Enable/disable call waiting by checking/unchecking the box.
- **forward number:** Enter receiving forwarded calls phone number into this field; If the IP phone used with modem, with **modem** item selected in **IPTYPE** list box, and then fill ISP number into this field.
- **fwd poweroff:** Forward calls if power off by checking this box. Please enter receiving forwarded calls phone number into **fwd number** field.
- **fwd noanswer:** Forward calls without replying by checking this box. Please enter receiving forwarded calls phone number into **fwd number** field.
- **fwd always:** Forward all calls by checking this box. Please enter receiving forwarded calls phone number into **fwd number** field.
- **fwd busy:** Forward calls if busy by checking this box. Please enter receiving forwarded calls phone number into **fwd number** field.
- **answer:** Enter a number from 0 through 60 to set the entries of the seconds before the phone answer the call auto or forward the calls.

 **Note** please refer to FAQ for more information of dial plan

3.2.4 IAX2 Protocol Settings:

IAX2 Protocol Settings				
service addr	203.93.9.57	register ttl	60	
phone number	82378808	account		pin
local port	1720	dtmf	outband signal	tos
super password	12345678	debug	output	

Fig 3.5 IAX2 Protocol Settings

- **service addr:** Please set the URI (domain name/IP address : service port) of the asterisk server into “service addr”. When the default service port 4569 is used, “: service port” can be omitted.
- **register ttl :** IP phone will send a keep-alive registration message to the asterisk server every “register ttl” seconds. The minimum value is 10, maximum value is 65535. Default is 60.
- **phone number:** The local phone number or username of this phone, usually is allocated by system.
- **account:** With the asterisk server which requires authentication, please put the username/account into this field.
- **pin:** With the asterisk server which requires authentication, please put the password into this field.
- **local port:** The local UDP port registered with the asterisk server to accept incoming handshaking messages. The default port number is 4569.
- **dtmf:** Set DTMF signal sending way by selecting inband audio, outband audio from list box.
- **tos:** Set the TOS field of the IP header of the RTP packets. The bigger this value is 0, the higher priority the packet is .
- **super password:** Set the super password of the phone.(Default super password is 12345678).
- **debug:** Set the debug level of the phone.
 - **disable:** Disable output the debug message by selecting this item.
 - **output:** Output the operation information to the window, such as register, input by selecting this item.
 - **output all:** Output all debug information and data in test window by selecting this item.
 - **remote debug:** Save the debug information in SDRAM of IP phone

by selecting this item.

- **no check:** Disable checking firmware tags when upgrading. This is not suggested, because it will increase the risk of upgrading the wrong firmware into the phone.

3.2.5 Other settings:

Other Settings			
password	1234	upgrade type	disable
sntp ip	0.0.0.0	use daylight	☐
timezone	(GMT+08:00)Beijing, Hong Kong, Urumqi		
Save Settings		Address Book	Upgrade Firmware

Fig 3.6 Other Setting Page

- **password:** Set the password of the phone. (Default password is 1234).
- **upgradetype:** Set the auto-upgrade type of the phone.
 - **disable** : Disable auto-upgrade .
 - **all**: AT320 will find matching firmware binary file and configuration file of the hardware type only at the FTP server specify by upgradeaddr item .
 - **mac**: AT320 phone will find matching firmware binary file and configuration file of the MAC address only at the FTP server specify by upgradeaddr item .
 - **ppp id**: AT320 phone will find matching firmware binary file and configuration file of the ppp id only at the FTP server specify by upgradeaddr item .
 - **account**: AT320 phone will find matching firmware binary file and configuration file of the account only at the FTP server specify by upgradeaddr item .
 - **phonenumber**: AT320 phone will find matching firmware binary file and configuration file of the phone only at the FTP server specify by upgradeaddr item .
- **upgrade addr:** Put IP address or domain name obtained by ISP of FTP server supplying upgrade program into this field.
- **sntp IP:** Fill IP address of time server here. When network without Internet connect, Fill special IP address 255.255.255.255.
- **use daylight:** Enable/disable daylight.
- **timezone:** Select correct time zone in list box.

When debug set as 0[disable], if input ordinary password (default one is 1234), then following page will pop up after clicking . And only those

parameters can be modified.

Network Settings					
iptype	static	ppp id		ppp pin	
local ip	192.168.1.100	subnet mask	255.255.255.0	router ip	192.168.1.254
dns	202.106.46.151	dns2	202.96.128.68	mac	00-09-45-0a-45-2e
Audio Settings					
codec1	g729	codec2	g7231	codec3	g711u
codec4	g711a	codec5	null	codec6	null
vad	☒	agc	☐	aec	☒
audio frames	2	g.723.1 high rate	☒	ilbc payload	98
jitter size	0	handset in(0-15)	7	handset out(0-31)	20
ring type	dtmf	speaker out(0-31)	20	speaker in(0-15)	0
Dial Plan Settings					
use dialplan	disable	dial number		ddd code	10
idd code	86	idd prefix	00	ddd prefix	0
inner line	disable	inner line prefix	0	call waiting	☐
forward number	82378801	fwd poweroff	☐	fwd noanswer	☐
fwd always	☐	fwd busy	☐	answer	30
use digitmap	☒				
Other Settings					
password	1234	upgrade type	disable	upgrade addr	
sntp ip	255.255.255.255	use daylight	☐		
timezone	(GMT+08:00)Beijing,Hong Kong,Urumqi				
Save Settings		Address Book		Upgrade Firmware	

Fig 3.7 Setting Page using ordinary pin with Debug set as 0 [disable]

- **Save Settings** : Click this button to save the configuration and the phone will reboot. Once the phone reboots successfully, the new configuration is effective.

 **Note** After entering set page, if **save settings** button is not clicked within 10 minutes, then when you click it again, the index page asking for pin will pop up again. Then please input the password again to enter the set page and then click **save settings** button to confirm the modification.

- **Address Book**: Click this button to open the speed dial settings page. Please refer to Fig 3.8. In this page, you can set and save the speed dial number by typing the name into the Name field and then entering the corresponding number following the name. For example, input Jack in **Name** field following 001, and then input 5989426454 into **Phone number** field. Then Jack's number 5989426454 is saved in phone book. Then please click **Save/Back** button. In normal state, you can use speed dial to call numbers saved in phone book.

Phone Book					
No.	Name	Phone Number	No.	Name	Phone Number
001	Jack	5989426454	002	Allen	192.168.1.56
003			004		
005			006		
007			008		
009			010		

Fig 3.8 Phone Book Illustration

- **Upgrade Firmware:** Click this button to update the program, the ring and the digit map of IP phone.

Firmware File Name:		浏览...	Update Firmware
Digitmap File Name:		浏览...	Update Digitmap
Ring File Name:		浏览...	Update Ring

Fig 3.9 Upgrade firmware Illustration

3.3 Configured by PalmTool

PalmTool is a tool designed especially to configure and upgrade the AT-320 IP phone. On a PC double click  icon to open the PalmTool. The index page of PalmTool will popup.

Input the IP address of the phone into **Local IP** field (such as 192.168.1.100), and then click “Phone Settings” button.

Use PalmTool to set the IP phone, please set debug as output or output all firstly, otherwise PalmTool cannot connect IP phone. The parameters of PalmTool is same as the parameters in HTTP, so please refer to HTTP set chapter to learn how to set IP phone.

3.4 Telnet Configuration

- On the PC choose **Start>Run**, and then type **telnet 192.168.1.100** into **Run** field in popuping Run dialog. Or input **telnet 192.168.1.100** in the DOS window. Then the following information will be displayed.

PA168X V1.43 settings

Password :

Then please type password. With debug is set as 0[disable], if type ordinary password (default one is 1234), after Retun, you will see:

Password : ****

P:\>

If you type super password, then you will see:

Password : *****

P:\>

Above information indicates that IP phone is under setting mode, and then you can set the AT-320 IP phone by using the telnet commands.

3.4.1 AT-320 Telnet Commands Explanation

AT-320 Telnet Commands

Command	Function
?	Supply command name and parameters
get	Display basic parameters of AT-320 IP phone
set	Set parameters of AT-320 IP phone
store	Save current settings to designated position
load	Load designated settings to current position
exit	Exit from the setting mode without saving the configuration
write	Exit with saving all configurations and restart AT-320
ping	Ping other net parameter
ftp	The phone connects to FTP server and then get the files

Detail descrIption of AT-320 Telnet commands

➤ **Command ?**

Syntax descrIption: No optional parameter

Usage: Type command name and parameters following P:\> . Be used as the keyword to supply keyword and parameters of the relevant commands.

Relevant usage: None

Detailed description:

? List help of all commands

For example:

P:\>?	
set	
get	list settings
store x	store current to xth settings
load x	load xth settings to current
exit	
write	save settings

➤ **Command get**

Syntax description: No optional parameter of keywords

Usage: Display basic parameters of AT-320 IP phone

Relevant usage: None

Detailed description:

get Display basic running parameters of the AT-320 IP phone.

Input ordinary password without debug being set as 0[disable], or input super password with debug set as 0[disable], then following parameters of IP phone will be displayed:

PA168X V1.43 settings

Password: *****

P:\>get

*****Network Settings*****

IPtype 0[static]

IP 192.168.1.100 subnetmask 255.255.255.0 router 192.168.1.254

dns 202.106.196.152 dns 2202.106.196.115 mac 00-09-45-65-a3-e6

*****Audio Settings*****

codec1 0[g729] codec2 1[g7231] codec3 2[g711u]

codec4 3[g711a] codec5 6[null] codec6 6[null]

vad 1[enable] agc 0[disable] aec 1[enable]

audioframes 2 6.3k 1[enable] ilbcpayload 98

jittersize 0 handsetin 7 handsetout 20

ringtype 0[dtmf] speakerout 20 speakerin 0

*****Dial Plan Settings*****

dialplan 1[enable] dddcode 10

iddcode 86 iddprefix 00 dddprefix 0

innerline 1[enable] innerlineprefix 0 callwaiting 1[disable]

```

fwdnumber 82378009 fwdpoweroff 1[enable]
fwdalways 1[enable] fwdbusy 1[enable] fwdnoanswer 1[enable]
answer 30 digitmap 1[enable]
*****Protocol Settings*****
serviceaddr 203.93.9.57 registerttl 60
phonenummer 82378808 account [empty] pin [empty]
localport 1720 dtmf 1[outband signal] tos 0
*****Other Settings*****
superpassword 12345678 debug 1[output]
password 1234 upgradetype 0[disable]
upgradeaddr [empty]
sntpIP 0.0.0.0 daylight 0[disable]
timezone 55[(GMT+08:00)Beijing,Hong Kong,Urumqi]
```

Input ordinary password with debug set as 0[disable], following information will be seen:

```

PA168X V1.43 settings
Password:****
P:\>get
*****Network Settings*****
IPtype 0[static]
IP 192.168.1.100 subnetmask 255.255.255.0 router 192.168.1.254
dns 202.106.46.151 dns2 202.96.128.68 mac 00-0d-ea-00-00-03
*****Audio Settings*****
codec1 0[g729] codec2 1[g7231] codec3 2[g711u]
codec4 3[g711a] codec5 6[null] codec6 6[null]
vad 1[enable] agc 0[disable] aec 1[enable]
audioframes 2 6.3k 1[enable] ilbcpayload 98
jittersize 0 handsetin 7 handsetout 20
ringtype 0[dtmf] speakerout 20 speakerin 0
*****Dial Plan Settings*****
dialplan 1[enable] dddcode 10
iddcode 86 iddprefix 00 dddprefix 0
innerline 1[enable] innerlineprefix 0 callwaiting 1[disable]
fwdnumber 82378009 fwdpoweroff 1[enable]
fwdalways 1[enable] fwdbusy 1[enable] fwdnoanswer 1[enable]
answer 30 digitmap 1[enable]
*****Other Settings*****
password 1234 upgradetype 0[disable]
upgradeaddr [empty]
sntpIP 0.0.0.0 daylight 0[disable]
timezone 55[(GMT+08:00)Beijing,Hong Kong,Urumqi]
```

➤ **Command set**

Syntax description: set keywords value

Usage: Used to configure password and other running parameters of AT-320 IP phone.

Detailed description:

set IPtype X

Set how IP phone gets relevant network parameters. X ranged from 0 through 3: 0: authorize users set IP address, subnet mask and router IP address of IP phone manually; 1: use DHCP mode. With this system, your LAN or router automatically assigns all the required network parameters to any device connected to it when the device log on. AT-320 IP phone is shipped from the factory with DHCP on. So, if your LAN or router is configured to use DHCP addressing, the IP phone's LAN parameters will automatically be configured as soon as it is connected to the LAN or router and powered up; 2: use PPPoE mode. Those ADSL and Cable Modem users please select this item for it is a protocol especially designed for them. With this system, ADSL ISP automatically assigns all the required IP parameters to any device connected to it when the device log on; 3: use modem mode. Those who use IP phone with modem, please set the value as 3.

set pppid XXX

With **IPtype** set as **2**, use this command to set ADSL ID; with **IPtype** set as **3**, use this command to set Modem ID.

set ppppin XXX

With **IPtype** set as **2**, use this command to set ADSL pin; with **IPtype** set as **3**, use this command to set Modem pin.

set IP XXX.XXX.XXX.XXX

With **IPtype** set as **0**, use this command to set IP address of AT-320 IP phone.

set subnetmask XXX.XXX.XXX.XXX

With **IPtype** set as **0**, use this command to set subnet mask of AT-320 IP phone.

set router XXX.XXX.XXX.XXX

With **IPtype** set as **0**, use this command to set router IP of network with AT-320 IP phone.

set dns XXX.XXX.XXX.XXX

With **IPtype** set as **0**, use this command to set IP address of DNS server.

set dns2 XXX.XXX.XXX.XXX

With **IPtype** set as **0**, use this command to set IP of backup DNS server.

set mac XX-XX-XX-XX-XX-XX

Set MAC address of the AT-320 IP phone. Parameter

xx-xx-xx-xx-xx-xx must be an HEX number.

set codec1 X

Set the priority 1 of the audio compression algorithm. X is range from 0 through 4: 0: g729; 1: g7231; 2: g711u; 3: g711a; 4: gsm.

set codec2 X

Set the priority 2 of the audio compression algorithm. X is range from 0 through 4: 0: g729; 1: g7231; 2: g711u; 3: g711a; 4: gsm.

set codec3 X

Set the priority 3 of the audio compression algorithm. X is range from 0 through 4: 0: g729; 1: g7231; 2: g711u; 3: g711a; 4: gsm.

set codec4 X

Set the priority 4 of the audio compression algorithm. X is range from 0 through 4: 0: g729; 1: g7231; 2: g711u; 3: g711a; 4: gsm.

set codec5 X

Set the priority 5 of the audio compression algorithm. X is range from 0 through 4: 0: g729; 1: g7231; 2: g711u; 3: g711a; 4: gsm.

set codec6 X

Set the priority 6 of the audio compression algorithm. X is range from 0 through 4: 0: g729; 1: g7231; 2: g711u; 3: g711a; 4: gsm.

set vad X

Enable/disable VAD. X is ranged from 0 through 1: 0: disable VAD; 1: enable VAD.

set agc X

Enable/disable AGC. X is ranged from 0 through 1: 0: disable AGC; 1: enable AGC.

set aec X

Enable/disable AEC. X is ranged from 0 through 1: 0: disable AEC; 1: enable AEC.

set audioframes X

Set audio frames in RTP package. X is Arabic numerals between 0 and 7.

set 6.3k X

With G.7231, set AT320 IP phone to use 6.3K rate or not. X is ranged from 0 through 1: 0: use 6.3K rate; 1: use 5.3K rate.

set jittersize X

Set buffer size of RTP package. X is range from 0-32.

set ilbcpayload X

Set the payload type of RTP package when ILBC codec selected to DTMF delay. X is range from 96-255.

set handsetin X

Set initial volume of handset. X is ranged from 0 through 15.

set handsetout X

Set initial volume of handout. X is ranged from 0 through 31.

set ringtype X

Set types of ring. X is ranged from 0 through 3: 0: ring as ordinary rings in different frequency; 1: do not ring; 2: ring as music saved by user; 3: Set ring used the individualized tone provided by system (need system support).

set speakerin X

Set initial volume of microphone of the base. X is ranged from 0 through 15.

set speakerout X

Set initial volume of speaker out. X is ranged from 0 through 31.

set dialplan X

Enable/disable dial plan and dial number. Parameter X ranged from 0 through 4: 0: disable dial plan; 1: enable dial plan; 2: use dial number; 3: use 179XX service.;4: use hotline function.

set dialnumber XX

When **set dialplan** value set as 2, please use this command to set dial number. For example, with eTalk card used, please set it as 00. When **set dialplan** value set as 4, please use this command to set hotline number.

set dddcode XX

Set the area code when **set dialplan** value set as 1 or 2. For example, the area code of Beijing is 10; the area code of Shanghai is 21, and the area code of Chengdu is 28, etc. Parameter xxx must be an Arabic numeral and no longer than 3 characters.

set iddcode XXX

Set the country code when **set dialplan** value set as 1 or 2. For example, the country code of China is 86; the country code of USA is 1, etc. Parameter xxxx must be an Arabic numeral and no longer than 4 characters.

set iddprefix XX

Set IDD service prefix number when **set dialplan** value set as 1 or 2. For example, IDD service prefix number of china is 00; IDD service prefix number of USA is 1, etc. Parameter xxx must be an Arabic numeral and no longer than 3 characters.

set dddprefix XX

Set DDD service prefix number when **set dialplan** value set as 1 or 2. For example, DDD service prefix number of china is 0; DDD service prefix number of USA is 1, etc. Parameter xxx must be an Arabic numeral and no longer than 3 characters.

set innerline X

Set use innerline call or not. X ranged from 0 through 1: 0: disable; 1: enable innerline call.

set innerlinepreifx X

With **innerline** set as 1[enable] , please set the prefix to pick up inner line, such as 0.

set callwait X

Set whether to use call wait. X ranged from 0 to 1: 0: do not use call wait; 1: use call wait.

set fwdnumber XXXXXXXX

Set receiving forwarded calls phone number. XXXX must be an Arabic numeral and no longer than 16 characters

set fwdalways X

Enable/disable forward all calls. X is ranged from 0 through 1. 0: do not forward all calls; 1: forward all calls.

set fwdbusy X

Enable/disable forward calls if busy. X is ranged from 0 through 1. 0: do not forward calls if busy; 1: forward call if busy.

set fwdnoanswer X

Enable/disable forward calls without replying. X is ranged from 0 through 1. 0: do not forward calls without replying; 1: forward call without replying.

set answer X

Set the ring seconds before the phone answers the call auto or forward the calls. X is ranged from 0 through 60.

set digitmap X

Set whether to use digitmap. X ranged from 0 to 1: 0: do not use digitmap; 1: use digitmap.

set serviceaddr XXXX

Set IP address or domain name of asterisk server.

set registerttl X

Set register TTL. X is range from 10 through 65535 Sec. Default value is 60 Sec.

set phonenumber XXXXXXXXX

Set a local ID of AT-320 IP Phone. Value xxxxx must be an Arabic numeral and no longer than 16 characters.

set account XXXXXX

Set the account; Value xxxxxx must be an Arabic numeral and no longer than 32 characters.

set pin XXXXXXXXXXXX

Set the account; Value xxxxxx must be an Arabic numeral and no longer than 32 characters.

set localport XXXX

Set the local port. Value XXXX default is 4569.

set dtmf X

Set DTMF relay type. X is ranged form 0 through 1: 0: Inband audio; 1: outband audio.

set tos X

Set TOS segment of IP head package in RTP digital follow. X is range from 0 through 224.

set superpassword XXXX

Set super password of the AT320 IP phone. XXX must be ASCII characters.

set debug X

Set open debugging message output grade for special tool. X is ranged from 0 through 5: 0: close debugging output; 1: output the operation information to the window; 2: output all the bug information and data in test window; 3: save the bug information into SDRAM; 4: disable checks the mark.

set password XXXX

Set password of the AT-320 IP phone. XXX must be ASCII characters.

set upgradetype X

Set auto-upgrade matching type, X is range from 0 through 5, 0-----disable; 1-----all ; 2----- mac; 3-----ppp id; 4----- account; 5----- phone number.

set upgradeaddr XXX.XXX.XXX.XXX

Set IP address or domain name of FTP server supplying upgraded program of AT-320 IP phone.

set snntpIP XXX.XXX.XXX.XXX

Set IP address of time server.

set daylight X

Set use daylight or not. X ranged from 0 through 1: 0: do not use daylight; 1: use daylight.

set timezone XX

Set time zone.

➤ **Command store**

Syntax descriPtion: no keyword. Parameter ranged from 0 through 4.

Usage: Save the current settings to the designated position.

Relevant Usage: store 1

➤ **Command load**

Syntax descriPtion: no keyword. Parameter ranged from 0 through 4.

Usage: Load the designated settings to the current position.

Relevant Usage: load 1

➤ **Command exit**

Syntax descriPtion: no keyword and parameter

Usage: Exit from Telnet command window without saving the configuration.

Relevant usage: None

➤ **Command write**

Syntax description: No keyword and parameter

Usage: Save the configuration and restart the AT-320 IP phone.

➤ **Command ping**

Syntax description: ping IP address

Usage: ping IP address of other NAT device

Relevant usage: In telnet window, input ping xx.xxx.xx.xx (an IP address) and return, then the result will be displayed. If the address is effective, “ping OK” will be seen; if the address is ineffective, nothing will be seen. For example:

```
P:\>ping 203.93.9.57
P:\>
ping OK
P:\>ping 27.56.120.56
P:\>
```

 **Note** Usually, the echo time of ping command is no more than 1 second. So if the result is not displayed in 5 seconds, ping command is fail.

➤ **Command ftp**

Syntax description: ftp value

Usage: the system connects to the FTP server auto to get the corresponding file and deal with it.

Relevant usage: ftp X

X ranged from 0 through 2:

X-0: Connect to FTP Server to get the file of updating program and save it to the SDRAM of the phone. Then the file can be read by PalmTool. This operation aims at testing.

X-1: Connect to FTP Server to get the file of updating program and update program Flash. This operation aims at updating program.

X-2: Connect to FTP Server to get the file of updating dial rules and update program Flash. This operation aims at updating dial rule.

 **Note** When you use ftp 0 and ftp 1 commands, if the file get from FTP server is too large or the net speed is too slow, then the process will not be seen in telnet window. Please be patient. Using ftp command in telnet to get file spends almost same minutes as getting file using phone. So if nothing is displayed after too long time, it means that ftp is fail.

 **Note** All the Telnet commands of AT-320 IP phone should be written in low case and the password is case sensitive.

4. Upgrade AT-320 IP phone

4.1 Use IE browse to upgrade the IP phone

Step 1: Fill the AT320's IP in the IE browse (you can obtain AT320 IP through the "Local IP" button of keypad)

Step 2: Use super password to access the AT320 setting page and choose the **debug** caption to the item except "no output".

Step 3: Click **Upgrade firmware**, **select the correct program on the upgrade program row and click upgrade to perform upgrade.**

4.2 Use the PalmTool to upgrade the IP phone

1) setting IP address

Press the "Local IP" button get the phone's IP address.

2) Choose the updating file

the updating file is .bin file , press upgrading the program , there come out a new window ,and choose the corresponding updating file and confirm it.

3) End of Upgrading.

During upgrading, the Palmtool shows the information of " Updating ... please wait until the update led stops flashing ". The updating will need some time, after updating successfully; the LCD will show " ready for call". At this point, the updating for IP phone is finished.

4.3 Use FTP to upgrade the phone

➤ Set FTP server

FTP server can be supplied by the server provider as well as setup by the users in LAN. Please set the IP address of FTP server.

➤ Prepare Updated program

You can ask the server provider for the latest version of program

➤ Operation

If you have got the IP address of the FTP server from ISP, please do as follows:

- Use keypad to enter setting mode
- Use keypad to input the IP address of FTP server

c) Press  , then No19 light will blink twice a second. Once the phone restarts successfully, the new program is effective.

 **Note** Please do not change the name of the upgraded program, or the operation will be fail.

5. Usage of the phone

5.1 Receiving calls

AT-320 IP phone can receive incoming calls from other AT-320 IP phone and devices that support the IAX2 protocol. It works just like an ordinary phone for incoming calls. When it rings, you can receive the call by following methods:

- ① Use handset: Lift the handset and begin speaking. When the call is over, put the handset back.

- ② Handset to hand free: While receiving call with handset, press  on the keypad and then put down the handset. When the call is over, press  again.

- ③ Hand free: Press  to speak to the other party. When the call is over, press  again.

- ④ Hand free to handset: While receiving the call with  pressed, pick up the handset to continue the call. When the call is over, put back the handset.

 **Note** When you communicate with the other party without lifting the handset, please do not exceed 40 CM from speaker.

5.2 Place a call

- **Call another IP phone under the same Gatekeeper:**

1. Handset: Pick up the handset and listen for the Internet dial tone. Then dial the phone number you wish to call and press  or  to end the dialing. Once the call connection has been established and the ring tone has sounded, wait for the other party to answer. When the other party answers, you can begin speaking. When the call is over, put back the handset. The dialed number has been saved into the buffer.
2. Hand free: Press  and listen for the Internet dial tone. Then input the phone number you wish to call and press  or  to end the dialing. Once the call connection has been established and the ring tone has sounded, wait for the other party to answer. When the other party answers, you can begin speaking. When the call is over, Press  again. The dialed number has been saved into the buffer.
3. Blind dialing: Use the keypad to enter the phone number you wish to call and then press  or  to make the call. Once the call connection has been established and the ring tone has sounded, wait for the other party to answer. When the other party answers, you can begin speaking. When the call is over, Press  again. The

dialed number has been saved into the buffer.

- **Place a call without login the Gatekeeper**

If AT-320 IP phone does not login the Gatekeeper, you can place a call by lifting the handset or pressing  and then inputting the IP address of the other party, and then pressing  or 

 **Note** When using direct IP call please use “*” replace the “.” In the IP address. For example dial 192*168*1*123 instead 192.168.1.123

5.3 View Records

- View missed calls

Click  then you will hear the record of missed call. Click  to turn the numbers orderly; click  to turn the numbers reservedly. If there is no record, you will hear nothing.

- View received call

Click  then you will hear the record of the received call. Click  to turn the number orderly; click  to turn the numbers reservedly. If there is no record, you will hear nothing.

- View dialed number

Click , then you will hear the record of the dialed call. Click  to turn the number orderly; click  to turn the numbers reservedly. If there is no record, you will hear nothing.

- When you hear the number you want to dial, please press  to place a call directly.

 **Note** AT-320 IP phone supports saving 80 entries unanswered call, dialed call and received call ranged from 1-80 at best. When the entries arrives 80, the latest record will cover the first one. The record will lose when the phone restarts or turned on.

Appendix Table: AT-320 IP phone digital-character key map:

Keys	Press Once	Press Twice	Press Thrice	Press quartic	Press quintic
1	1	.	,	?/_	!//
2	2	A/a	B/b	C/c	[
3	3	D/d	E/e	F/f	]
4	4	G/g	H/h	I/i	*
5	5	J/j	K/k	L/l	
6	6	M/m	N/n	O/o	#
7	7	P/p	Q/q	R/r	S/s
8	8	T/t	U/u	V/v	
9	9	W/w	X/x	Y/y	Z/z
*	.				
0	0	space	:/@	;/-	\/&
#	Case change				

6. Reset AT-320 to factory default

AT- 320 has its default factory setting, Changing the firmware version or setting frequently may make the AT320 in a chaos status, In this case, you can restore the AT-320 to its factory default through the following procedure.

Power off, then press“*” and power on (Don’t lose the * until the LCD shows “page0 running ”or“”), press “#5*5”

7. FAQ

Q1 For two ports of the AT-320/AT-323, what is the function for the other port?

A: The other port can be connected with other network equipments, such as Hub, switch, PC, IP phone.

Q2 Why I can't see the complete setting page when access the AT-320 by IE?

A: Pls. access the AT-320 through super password. You can't see the complete setting page through normal user password when the "debug" option is set to disable.

Q3 How to use the PalmTool to upgrade the IP phone?

A: 1) setting IP address

Press the "Local IP" button, get the phone's IP address. And fill this IP address in the "IP address" in palmtool.

2) Choose the update file

the update file is .bin file, press upgrading the program, then choose the corresponding updating file in the popping up window and click open to start update.

3) End of Upgrading.

During upgrading, the Palmtool shows the information of "Updating ... please wait until the update led stops flashing ". The updating will need some time, after updating successfully, the LCD will show "ready for call". At this point, the updating for IP phone is finished.

Q4 Why the Palmtool shows "can't connect to palm1" message box?

A: there are several reasons that palmtool shows "can't connect to palm1" when user try to use palmtool to configure the phone.

1. AT-320 was not connected to the computer.
2. The IP address you have filled in the Palmtool is not the IP address of your phone.
3. The "debug" option is set to "disable". You can change it to output through IE.
4. Your computer and your phone are in the difference subnet. Please change the setting of your computer or the phone to let them in the same network.

Q5 How to update the protocol for the AT-320/AT-323?

A: Please refer to **chapter 4**

Q6 After updating AT-320/AT-323 ,the LCD shows " ■ ■ " and stops ,how to deal with it?

A: (1) Reset to the factory default; if it still can't solve the problem ,pls. refer to (2).

(2) Enter into the safe mode (press " * "button ,then power on till the LCD shows" *") and re-upgrade the IP phone by Palmtool. (please refer to **Q3**, AT320 will have default IP 192.168.1.100 in safe mode)

(3) If you can't solve the problem , pls. return the phone to the reseller for repairment .

Q7 Why is the local IP 0.0.0.0?

A:If the AT-320 "**IPtype**" is set to "DHCP" and your network doesn't support DHCP function.The AT-320 will shows "0.0.0.0". Pls. Check your network in this case.

Q8 Why is the local IP 255.255.255.255?

A: Probably IP phone fails to get IP address if you choose the "IPtype" to PPPOE, you can set your AT-320's "**IPtype**" to "static" or "DHCP" through keypad(please refer to **chapter 3.1**). or reset to the factory default.

Q9 How to reset the AT-320/AT-323 to the factory default?

A: Power off ,then press"*" and power on(Don't lose the * until the LCD shows "page0 running"or"*") , press "#5*5"

Q10 How to use the speed dial function?

A: Use Palmtool or IE to enter into the setting page, find the address book, fill the name and the full number in the right blank. For example: fill "Jack" in the blank after 001,input 56489237 in the blank of phone number, then , Jack's number of 56489237 will be saved in the first position . After setting all of the number, press save button,then return to the phone. press **speaker + 001 + speed** button , then the phone will dial 56489237 automatically. Or use the 9

speed dial key on the top side of the phone: press speaker, then press one of the 9 speed dial key to send the desire number.

Q11 Why is there no sound after pressing the speaker button while using MGCP protocol?

A: The speaker button will have the sound only after registering successfully with the MGCP protocol.

Q12 Why does the other side feel my voice is very weak?

A: Pls. adjust the input volume larger, but pls. note the maximum is 15.

Q13 Why do AT-320/AT323 IP phone and AG-168V gateway disconnect while calling each other, but it rings?

A: Pls. check if the codec of the phone and gateway is same .

Q14 What is Dial Plan used for? How to configure it?

A:Dial plan is used to convert the number dialed to the number actually sent based on "dial number", "ddd prefix", "idd prefix", "ddd code", "idd code"these parameters. Parameter "use dial plan"contains 5 options:

1."disable"

Number sent is the same as number dialed.

2."enable"

If the number dialed is prefixed by "idd prefix", the number sent will be the rest part of the number dialed dropping off the "idd prefix".

Otherwise, if the number dialed is prefixed by "ddd prefix", the number sent will be "idd code"+ the rest part of the number dialed dropping off the "ddd prefix".

Otherwise, the number sent will be "idd code"+ "ddd code"+ the number dialed. For example: set "ddd code"= 10, "idd code"=86, "idd prefix"=00, "ddd prefix"=0.

If the number dialed is 00-1-4089821818, the number sent will be 1-4089821818.

If the number dialed is 021-82378008, the number sent will be 8621-82378008.

If the number dialed is 82378008, the number sent will be 861082378008.

3."dial number"

Convert the number dialed to a new number according to "enable"dial plan, then prefix "dial number"to this new number. This new number is the number sent.

4."prefix"

Effective only when "dial number" is not empty. This serves for those calling cards.

The number sent is just "dial number". During the call connection, program will automatically send out a number made up with ["account"+ "pin"+ number converted by "enable"dial plan + '#'].

5."hotline"

The number sent is "dial number". Whenever the handset is lifted up, this number will be automatically dialed out.

Q15 What is "inner line"?

A:Parameters "inner line"and "inner line prefix"help to distinguish whether the number dialed is an inner line number. "inner line"contains 3 options:

1."disable"

No distinction among numbers. The number sent is the number converted according to parameter "use dial plan".

2."enable"

If the number dialed is prefixed by "inner line prefix", the number sent is just the number dialed because this number is an inner line number. Otherwise, the number sent is the number converted according to parameter "use dial plan".

3."omit prefix"

The only difference between 2 "enable" is that if the number dialed is prefixed by "inner line prefix", the number sent is the number dialed dropping off this prefix.

Q16 Why does it take so long before the phone logs in to the server? How to speed it up?

A:Before registration, phone will first visit FTP server and check if the server has got new firmware or settings to upgrade, then it will visit the time server on the Internet to get current date and time. If the FTP server's address is a domain name, program will visit DNS to resolve this domain name into IP address. Besides, if local IP address is allocated by DHCP, we will check if the allocated IP address conflicts with other devices. All these work will cost some

time to complete, which causes the delay of registration. To speed it up, try the following two methods:

- 1.set "upgrade type" to "disable", then phone will not check new upgrades from the FTP server.
 - 2.set "sntp IP"to "255.255.255.255", then phone will not visit timer server to get date and time. If one must know the current date and time, please set "sntp IP" to the IP address of a local time server which has fast access.
-

Q17 How to set TOS field?

A:The 8-bit TOS field specifies how the datagram should be handled and is broken down into five subfields: Let's assume that bit 0 is the most-important-bit and bit 7 is the least-important-bit.

Bit 0-2: Three PRECEDENCE bits specify datagram precedence, with values ranging from 0 (normal precedence) through 7 (network control), allowing senders to indicate the importance of each datagram.

Bit 3: Also called D bit. When set, the D bit requests low delay.

Bit 4: Also called T bit. When set, the T bit requests high throughput.

Bit5: Also called R bit. When set, the R bit requests high reliability.

Bit 6-7: Unused

TOS is just a hint to the routing algorithm that helps it choose among various paths to a destination. An internet does not guarantee the type of transport requested.

Q18 How to use call transfer function?

Two types of call transfer are implemented. **Unattended** call transfer and **Attended** call transfer.

Unattended call transfer: A calls B and is connected with B, A want B to transfer itself to C. B **hold** A, press the **number of C**, then press the "**FWD**" key. Now B will hear busy tone and B can hang up now, and if C is available, C will be ringing and A will hear ringback tone. Now A is transferred to C. If C is unavailable, A will hear busy tone.

Attended transfer: A calls B and is connected with B, A want B to transfer itself to C. B **hold** A, press the **number of C**, and press the "**#**"key to call C. If C is available, C will be ringing, when C answers the call, B is connected with C and start talking to C. Now B press "**FWD**" key to transfer A to C. Once the "**FWD**" key is pressed, A and C is connected and A can start talking with C.

If C is unavailable, B will hear busy tone, then B can press "**call hold**" key to switch back to A and tell A that C is not there.

*Reserves the right to make changes in technical and product specification
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